DATASHEET - EC4P-222-MRAX1

Compact PLC, 24 V DC, 12DI(of 4AI), 6DO(R), 1AO, ethernet, CAN

Part no. **EC4P-222-MRAX1**
106406

Powering Business Worldwide™

General specifications

Product name	Eaton EC4P Compact PLC
Part no.	EC4P-222-MRAX1
EAN	4015081061761
Product Length/Depth	72 millimetre
Product height	90 millimetre
Product width	107.5 millimetre
Product weight	0.358 kilogram
Certifications	CSA-C22.2 No. 0-M UL File No.: E135462 CSA-C22.2 No. 142-M UL Category Control No.: NRAQ CSA CSA Class No.: 2252-01 UL508 CSA File No.: 012528 UL IEC/EN 61000-4-2, Level 3 CE
Product Tradename	EC4P
Product Type	Compact PLC
Product Sub Type	None
Catalog Notes	Expandable: Inputs/outputs and bus systems

Features & Functions

Features	190 received bytes in a block (PRG interface RS232, Master mode) Overload and short-circuit protection Asynchronous, cyclic, acyclic PDO types (operating modes of the slave)
Fitted with:	Power supply Function module Other components Ethernet on board easyNet/CANopen® on board Digital input module Engineering software Memory unit Analog input module Analog output module Digital output module Documentation Basic device Communication module Libraries
Functions	Building blocks
Inscription	Individual inscription possible with EC4-COMBINATION-*
Processor	Infineon XC161

General information

Cable length	100 m, unshielded, Digital inputs 24 V DC 30 m, screened, Analog inputs
Degree of protection	IP20
Display temperature - min	0 °C
Display temperature - max	55 °C
Lifespan, electrical	25,000 Operations (Filament bulb load at 1000 W, 230/240 V AC) 25,000 Operations (Fluorescent lamp load 1 x 58 W at 230/240 V AC, conventional, compensated) 25,000 Operations (Filament bulb load at 500 W, 115/120 V AC) 25,000 Operations (Fluorescent lamp load 10 x 58 W at 230/240 V AC, with upstream electrical device) 25,000 Operations (Fluorescent lamp load 10 x 58 W at 230/240 V AC, uncompensated)
Lifespan, mechanical	10,000,000 Operations 10,000,000 Operations (Relay outputs)
Mounting method	Screw fixing using fixing brackets ZB4-101-GF1 (accessories) Top-hat rail fixing (according to IEC/EN 60715, 35 mm)

Overvoltage category	II
Pollution degree	2
Rated impulse withstand voltage (Uimp)	6 kV (contact-coil)
Rated insulation voltage (Ui)	250 V
Rated operational voltage	24 V DC (-15 %/+ 20 % - power supply) 20.4 - 28.8 V DC
Rated operational voltage (Ue) at AC - max	300 V
Recovery time	100 µs
Resolution	0.01 V analog (Analog inputs) 0.01 V DC analog (Analog outputs) 0.01 V digital (Analog inputs) 10 Bit (value 0 - 1023, Analog inputs) 10 Bit (value 0 - 1023, digital, Analog outputs)
Short-circuit protection	16 A, Short-circuit-proof cos φ = 0.5 to 0.7, characteristic B16 at 900 A, Contacts, Relay outputs 16 A, Short-circuit-proof cos φ = 1, characteristic B16 at 600 A, Contacts, Relay outputs
Utilization category	R 300 Light Pilot Duty, UL/CSA Control Circuit Rating Codes DC B 300 Light Pilot Duty, UL/CSA Control Circuit Rating Codes AC
Ambient conditions, mechanical	
Constant acceleration	2 g, 57 - 150 Hz, according to IEC/EN 60068-2-6, Vibrations
Constant amplitude	0,15 mm, 10 - 57 Hz, according to IEC/EN 60068-2-6, Vibrations
Drop and topple	50 mm Drop height, Drop to IEC/EN 60068-2-31
Height of fall (IEC/EN 60068-2-32) - max	1 m
Mounting position	Vertical Horizontal
Shock resistance	15 g, Mechanical, according to IEC/EN 60068-2-27, Half-sinusoidal shock 11 ms, 18 Impacts
Climatic environmental conditions	
Air pressure	1080 hPa (operation)
Ambient operating temperature - min	-25 °C
Ambient operating temperature - max	55 °C
Ambient storage temperature - min	-40 °C
Ambient storage temperature - max	70 °C
Environmental conditions	Clearance in air and creepage distances according to EN 50178, UL 508, CSA C22.2, No. 142 Condensation: prevent with appropriate measures
Relative humidity	5 - 95 % (non-condensing)
Electro magnetic compatibility	
Air discharge	8 kV
Burst impulse	2 kV, Supply cable According to IEC/EN 61000-4-4, level 3 2 kV, Signal cable
Contact discharge	6 kV, Electrostatic discharge (ESD)
Electromagnetic fields	10 V/m (according to IEC EN 61000-4-3)
Immunity to line-conducted interference	10 V (according to IEC/EN 61000-4-6)
Radio interference class	Class B (EN 55022) Class B (EN 55011)
Surge rating	2 kV, Supply cables, symmetrical, EASY...AC, power pulses (Surge), EMC 0.5 kV, Supply cables, symmetrical, EASY…DC, power pulses (Surge), EMC According to IEC/EN 61000-4-5, power pulses (Surge), EMC
Terminal capacities	
Terminal capacity (flexible with ferrule)	0.2/2.5 mm^2
Terminal capacity (flexible with ferrule AWG)	22 - 12
Terminal capacity (solid)	0.2/4 mm^2
Terminal capacity (solid AWG)	22 - 12
Screwdriver size	3.5 x 0.8 mm, Terminal screw
Tightening torque	0.6 Nm
Power supply	
Heat dissipation	3.4 W
Input voltage	Signal 0: < 8 V DC (I7 - I8, I11 - I12, Digital inputs, 24 V DC) Signal 0: < 5 V DC (I1 - I6, I9 - I10, Digital inputs, 24 V DC) Signal 1: > 8 V DC (I7 - I8, I11 - I12, Digital inputs, 24 V DC)

	Signal 1: > 15 V DC (I1 - I6, I9 - I10, Digital inputs, 24 V DC)
Residual ripple	≤ 5 %
Supply voltage at DC - max	24 V DC
Voltage dips	According to EN 61131-2 ≤ 10 ms

Communication

Bus termination	EASY-NT-R plug (incl. bus terminating resistor 120 Ω),first and last station, CANopen®
Character formats	8E1, 8O1, 8N1, 8N2, 7E2, 7O2, 7N2, 7E1, PRG interface RS232, Master mode
Connection type	RJ45, Ethernet 2 x RJ45, 8 pole, CANopen® RJ45, PRG Interface RS232
Cycle time	< 0.3 ms, for 1 k of instructions (Bit, Byte), CPU
Data transfer rate	0.6 kBit/s, PRG interface RS232, Master mode 500 kBit/s at 25 m, CANopen® 0.3 kBit/s, PRG interface RS232, Master mode 250 kBit/s at 60 m, CANopen® 125 kBit/s at 125 m, CANopen® 2.4 kBit/s, PRG interface RS232, Master mode 10 kBit/s at 1000 m , CANopen® 10 MBit/s, 100 m, Ethernet 19.2 kBit/s, PRG interface RS232, Master mode 38.4 kBit/s, PRG interface RS232, Master mode 57.6 kBit/s, PRG interface RS232, Master mode 4.8 kBit/s, PRG interface RS232, Master mode 20 kBit/s at 700 m, CANopen® 1.2 kBit/s, PRG interface RS232, Master mode 50 kBit/s at 300 m, CANopen® 9.6 kBit/s, PRG interface RS232, Master mode
Memory	256 kByte Program memory code 8 kByte Retain Memory 14 segments of 16 kByte Program memory data 4 kByte Output Memory 16 kByte Marker Memory 4 kByte Input Memory
Number of bytes	190 transmission bytes (in a block)
Number of modules	Max. 126 (slaves)
Station	To DS 301 V4, Control contact rated current, Mode slave, Interfaces
Write cycles of the retentive memory	10,000,000,000 read-write cycles

Input/Output

Accuracy	± 3 %, of actual value, two devices (Analog Inputs) ± 5 s/day (± 0.5 h⁄year), Real-time clock, normally ± 2, (I7, I8, I11, I12) ± 0.12 V, of actual value, within a single device (Analog Inputs) 2 %, Analog outputs at-25 °C - 55 °C 1 %, Analog outputs at 25 °C
Conversions	Each CPU cycle, Analog outputs Each CPU cycle, Analog inputs
Delay time	0.25 ms typ., Digital inputs 24 DC (I5 - I12), Delay time from 0 to 1 0.02 ms typ., Digital inputs 24 DC (I1 - I4), Delay time from 0 to 1
Incremental counter	Pulse shape: Square Signal offset: 90° Counter inputs: I1, I2 Value range: 32 Bit Number of counter inputs: 1 (I1, I2, I3, I4) Counter frequency: ≤ 40 kHz Input for reference switch: I4 Reference input: I3
Indication	LCD-display used as status indication of Digital inputs 24 V DC
Input	Voltage (DC)
Input current	3.3 mA (I9 - I10, at 24 V DC, at signal 1) 140 mA 3.3 mA (I1 - I6, at 24 V DC, at signal 1) 2.2 mA (I11 - I12, at 24 V DC, at signal 1) 2.2 mA (I7 - I8, at 24 V DC, at signal 1) 1 mA (Analog inputs)
Input impedance	11.2 kΩ
Insulation resistance	According to EN 50178
Load resistance	1 kΩ
Making/breaking capacity	3600/360 VA (AC, at B 300) 28/28 VA (DC, at R 300)
Number of inputs (analog)	4 (I7, I8, I11, I12)
Number of inputs (digital)	4 (I7, I8, I11, I12, can also be used as analog inputs) 12 (24 V DC) 12

	4 (can also be used as analog inputs)
Number of outputs	Relay outputs in groups of 1 8 Transistor Outputs 6 (relay outputs)
Number of outputs (analog)	1
Output	Voltage (DC)
Output current (mA) - max	100 mA
Parallel switching	Not permitted
Rapid counter inputs	2 (I1, I2) at 16 Bit or 1 (I1) at 32 Bit 50 kHz, Counter frequency 16/32 Bit (value range) ≤ 20 m (cable length, screened) Square (pulse shape)
Rated breaking capacity	300000 Operations at AC-15, 250 V AC, 3 A (600 Ops./h) 200000 Operations at DC-13, 24 V DC, 1 A (500 Ops./h)
Rated operational voltage (Ue) at DC - max	300 V
Relay output	> 500 mA (Recommended for load: 12 V AC/DC)
Signal range	0 - 10 V DC, Analog inputs
Switching frequency	0.5 Hz, Inductive load, Relay outputs 10 Hz, Relay outputs 2 Hz, Resistive load/lamp load, Relay outputs
Uninterrupted current	5 A AC, max. thermal continuous current cos φ = 1 at B 300 (UL/CSA) 10 A AC, at 240 V AC (UL/CSA) 8 A DC, at 24 V DC (UL/CSA) 1 A DC, at R 300 (UL/CSA)

Safety

Potential isolation	Between Relay outputs and Power supply: yes Basic isolation: 600 V AC (Relay outputs) Between Relay outputs and Inputs: yes Between Analog inputs and Interface/memory card: no Safe isolation according to EN 50178: 300 V AC (Relay outputs) Between Digital inputs 24 V DC and Outputs: yes In groups (Relay outputs) Between Digital inputs 24 V DC and network easyNet, easyLink Between Analog inputs and Outputs: yes
Protection of an output relay	Miniature circuit-breaker B16 or fuse 8 A (slow)
Safe isolation	300 V AC, Between two contacts, According to EN 50178 300 V AC, Between coil and contact, According to EN 50178

Design verification

Equipment heat dissipation, current-dependent Pvid	0 W
Heat dissipation capacity Pdiss	0 W
Heat dissipation per pole, current-dependent Pvid	0 W
Rated operational current for specified heat dissipation (In)	0 A
Static heat dissipation, non-current-dependent Pvs	3.4 W
10.2.2 Corrosion resistance	Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures	Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat	Meets the product standard's requirements.
10.2.3.3 Resist. of insul. mat. to abnormal heat/fire by internal elect. effects	Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation	Meets the product standard's requirements.
10.2.5 Lifting	Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact	Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions	Meets the product standard's requirements.
10.3 Degree of protection of assemblies	Meets the product standard's requirements.
10.4 Clearances and creepage distances	Meets the product standard's requirements.
10.5 Protection against electric shock	Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components	Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections	Is the panel builder's responsibility.
10.8 Connections for external conductors	Is the panel builder's responsibility.
10.9.2 Power-frequency electric strength	Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage	Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material	Is the panel builder's responsibility.
10.10 Temperature rise	The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating	Is the panel builder's responsibility.

10.12 Electromagnetic compatibility		Is the panel builder's responsibility.
10.13 Mechanical function		The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 8.0

Programmable logic controllers PLC (EG000024) / PLC device set (EC002581)		
Elektrotechnika, automatyzacja i technologia / Sterowanie / Sterownik programowalny (PLC) / PLC-Kompletne systemy (ecl@ss10.0.1-27-24-22-19 [BAA707013])		
Contains function building blocks		Yes
Contains basic device		Yes
Contains module rack		No
Contains power supply		Yes
Contains analogue input module		Yes
Contains analogue output module		Yes
Contains digital input module		Yes
Contains digital output module		Yes
Contains function module		Yes
Contains technology module		No
Contains communication module		Yes
Contains memory unit		Yes
Contains simulation module		No
Contains connection cable		No
Contains control unit		No
Contains monitor		No
Contains programming software		No
Contains engineering software		Yes
Contains visualization		No
Contains libraries		Yes
Contains documentation		Yes
Contains other components		Yes
Software preinstalled		No